



**GEOSCIENCES AND ENGINEERING DIVISION
QUALITY ASSURANCE
SURVEILLANCE REPORT**

PROJECT NOS: 06002.01.212,
214, 222, 232, 242, 011

REPORT No.: 2007-03

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SURVEILLANCE SCOPE: CNWRA Geochemistry (GC) activities:

- Quantity and Chemistry of Water Contacting Engineered Barriers and Waste Packages (QC)
- Radionuclide Release Rates and Solubility Limits (RR)
- Radionuclide Transport in the Unsaturated Zone (RTUZ)
- Radionuclide Transport in the Saturated Zone (RTSZ)

REFERENCE DOCUMENTS:

QAPs-001, 004, 007, 008, 013, 014, 019; TOPs-012, 018; AP-010

START DATE: 2/1/07

END DATE: 2/9/07

QA REPRESENTATIVE:
M. Simpson

PERSONS CONDUCTING ACTIVITY (persons contacted): E. Percy (Mgr), J. Myers, R. Pabalan, M. Juckett, D. Pickett, J. Prikryl, K. Chan (Div. 18), J. McMurry, S. Watson, P. Bertetti, B. Werling, M. Roberts (student), N. Hawkins (student)

SATISFACTORY FINDINGS:

General Observations:

Discussions to identify current work activities and procedural implementation were held with the GC Manager, Principal Investigators of each GC ISI, and associated staff and students currently charging time to GC project numbers. The following programmatic elements were addressed: Quality Requirements Application Matrices (GRAMs), scientific notebooks, software control, control of measuring and test equipment (M&TE), document control, chemical and sample control, and personnel qualification, training, and conflict of interest (COI).

GC GRAMs are current and essentially correct. The GC Manager updated the RR GRAM during the surveillance to delete reference to three consultants (from UTSA) that will no longer be utilized by GED.

TOUGHREACT software is still awaiting GED control and validation but is within the planned time frame for completion (first quarter CY 2007). The GC Manager is aware of the need to control this software in the near future. Other reviewed software are accurately referenced and are under appropriate control/validation.

Scientific notebooks appear to be generally comprehensive, up-to-date, well-maintained, readily available, and reasonably secure. A notebook number that did not precisely correspond to the one issued by document control will be changed by a staff member (i.e., 679 to 679E). In another instance, a staff member has routinely retained what appeared to be controlled copies of several closed-out notebooks. The staff member agreed to redact the "Controlled Copy" stamp from each notebook (a document control error that will be investigated separately) but continues to maintain the copies at present. While such retention is not precisely in conflict with GED requirements as currently written, the situation should be addressed to determine appropriateness in meeting the intent of QAP-012, *QA Records Control* and document retention guidance in AP-019, *Records Management* (see Recommendation 1). Additional notebook maintenance and improvement

suggestions were made and, for the most part, agreed to during the course of this surveillance. A couple of notebooks that have been open a long time and that were previously recommended for closure (during Surveillance 2006-12) are still open. The staff member has indicated the need to complete final entries in the notebooks and has agreed that they should (and will) be closed in the near future. The following notebooks were reviewed: 121, 800, 786E, 582, 823, 780, 679E, 596, 836. Additional GC notebooks had been recently reviewed as part of the recently concluded overall GED notebook surveillance.

Overall control of M&TE, samples, and chemicals is satisfactory. A few specific comments are included in individual GC sections (below).

QC:

Reactive transport modeling continues. There have been no deliverables as yet but this work may eventually result in the development of a technical report. Work on TPA User Guide Chapter 7, *Near Field Environment Module*, also continues. A first draft is scheduled for completion in early March. Humidity chamber experiments continue with dry mixtures, following the completion of wet solution work. Staff is currently deciding how to best disseminate this information; maybe a journal paper. Staff is still trying to determine the level of significance of salt deliquescence and is awaiting results of testing by CSPE (DOE currently maintains a position that deliquescence is not a significant issue). Additional dust samples will be requested from DOE for testing.

RR:

The Nopal field trip that was in preparation during the previous GC surveillance took place shortly thereafter. Staff observed DOE's seepage and well water collection systems and operation of a meteorological station. Rock samples were collected and returned to SwRI but have not yet been appropriately stored. A nonconformance report (NCR) was issued to address this (see Unsat. Findings below). Calculations on solubility limits in support of TPA continues. A summary of this work (colloid release and transport) was submitted as an abstract for an upcoming conference. Uranophane solubility experiments have been recently concluded with a corresponding report delivered to NRC in December; NRC comments are currently being addressed. Additional experiments on neptunium incorporation in uranophane continue. A suggestion was made and accepted to affix labels (for radioactivity) to completed neptunium/uranophane solution samples in a more timely manner. Preparations for contributing to the TPA User Guide have begun. Identification of potential RR issues in the upcoming LA are underway. Recent deliverables have included contributing to a CSPE report on fluid chemistry inside the waste package and to the NRC review of DOE's response on KTI agreements. A white paper on delayed hydride cracking is currently in review. It will probably be published after NRC approval. A literature review on the integrity of cladding during waste transport or storage is underway.

RTUZ:

The recent matrix diffusion literature review exercise resulted in a letter report. NRC has formally accepted this report but later had additional comments that are currently being addressed. Work on the TPA User Guide UZ Flow and Transport chapter is scheduled for immediate NRC submittal. There have been scheduling problems with the different reviews required for this work. The User Guide Committee submittal deadlines had not yet been firmly established for this chapter when work for this FY was being planned, resulting in the CNWRA technical and User Guide Committee reviews being performed at the same time and making for a somewhat difficult coordination task for the PI. However, the document is on track for timely submittal to NRC this week.

RTSZ:

Neptunium sorption on alluvium experiments continue. Sampling issues reported in the previous GC surveillance have been appropriately addressed and recorded; including staff training (by hands-on practice sessions) and the issuance of an extremely comprehensive and well-written NCR by the PI. One issue with the timely incorporation of radiation survey results into the control log was handled internally and does not appear to have affected the quality of the work. Review of the situation did raise some question about defined roles and responsibilities in the lab, including the need for issuance of established procedures for recurring work. The PI has agreed that defined procedures for standardized work may be helpful but expressed concerns about the resources available to accomplish this. The reviewer has discussed the situation with the GC Manager (see Recommendations 2 and 3 below). Procedure AP-010 was recently revised to address State of Texas chemical and instrumentation inventory requirements (note, not GED requirements). The inventory was completed on the day the procedure became effective. Suggestions for future improvements to the document (at its next revision) were made and one suggestion to complete cataloging of one last item on the inventory was made and was immediately implemented. A chapter for the TPA User Guide was recently completed and submitted. Information included in this chapter will be presented as an abstract to for presentation in an upcoming GSA conference. Additional work includes ongoing preparation for the anticipated LA and the compilation of possibly relevant Yucca Mountain information from Nye County databases.

Additional GC Activity:

The GC Manager is compiling a history of Division 20 for future presentation in a noontime seminar. The preliminary work sounds very interesting. The reviewer suggests that a broader audience (e.g., GED Quarterly Meeting) may also enjoy and benefit from hearing the presentation.

UNSATISFACTORY FINDINGS:

Rock samples collected in Nopal, Mexico during a June 06 field trip are not stored in a GED laboratory, as required. NCR 2007-03 has been generated to address this issue.

NCR NO.: NCR 2007-02

CAR NO.: None

ATTACHMENTS: None

RECOMMENDATIONS/ACTIONS:

1) One staff member has routinely retained bound reference copies of all of his closed out notebooks. This is contrary to the guidance of AP-019, section 6.2. While keeping specific "temporary" hard-copies as reference for current work is acceptable, maintenance of a personal library is excessive. Personal copies of QA records should be discarded unless specifically in compliance with procedural guidance. LSN and ELF should be utilized for reference purposes whenever practical. GED management should consider revision of procedures QAP-012 and AP-019 to specifically prohibit routine long-term personal retention of copies of QA records (including scientific notebooks) while retaining provision for infrequent temporary copies in specific situations.

2) GED laboratory practices and assignments should be reviewed to determine which, if any, should/could be proceduralized. The primary GC laboratory technician performs mainly standardized, recurring, and routine tasks that do not require scientific judgement or expeditious independent change. However, none of these activities are documented and are learned by verbal instruction and general oversight only. A detailed position description of the technician's work should also be considered, including a definitive documentation of laboratory roles and responsibilities and an unambiguous personnel hierarchy. Note: No current GC work appears to be directly affected by a lack of the recommended procedures and job descriptions. However, the development and use of procedures for laboratory work is a proven preventative tool to help continual assurance of the quality of the work and the safety of personnel. The use of position

descriptions and established clear lines of authority can also be of benefit in avoiding potential personnel and responsibility issues.

3) Management should consider a revision of the GED QA Manual to require, rather than suggest, the use of procedures for recurring quality-affecting activities. Also suggest consideration of a Manual revision to require the use of specific GED position descriptions for technicians (and possibly other staff performing routine defined work).

APPROVED:



DATE:

3/14/07

DISTRIBUTION:

ORIGINAL—QA RECORDS

QA DIRECTOR

ASSISTANT DIRECTOR: Wittmeyer

MANAGER: Percy

PRINCIPAL INVESTIGATORS: Myers, Pickett, McMurry, Bertetti